

The Kika de la Garza Plant Materials Center (PMC) is a 91-acre facility established to provide cost-effective vegetative solutions for soil and water conservation problems. This means identifying plants and developing techniques for successful conservation use. It also means assisting in the commercial development of these plants and promoting their use in natural resource conservation and other environmental programs.

The PMC was established in 1981. It is one of 27 centers located throughout the United States. The PMC is operated by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), in cooperation with an Advisory Board from Texas A&M University-Kingsville, the Caesar Kleberg Wildlife Research Institute (CKWRI), South Texas Association of Soil & Water Conservation Districts, and the Gulf Coast Association of Soil & Water Conservation Districts. The Kika de la Garza PMC serves approximately 27 million acres of the southern portion of Texas.

Program Emphasis

The mission of the Kika de la Garza PMC is to develop and transfer plant science technology to solve natural resource problems in the South Texas area. Plant testing and plant selection as well as the development of new plant science technologies are the primary products of our program. The PMC conducts plantings and studies at the Center and off-Center with cooperating partners. The PMC works with NRCS Field Offices and Resource Conservation and Development (RC&D) groups, Conservation Districts, federal and state agencies, and private landowners.

Our current program emphasis at the PMC is in the following areas:

- Rangeland Habitat Restoration and Enhancement
- Coastal Shoreline Stabilization
- Coastal Habitat Restoration and Enhancement
- Erosion Control/Water Quality Improvement on Agricultural Land

Following are highlights of some of the activities of the PMC for 2006. Please contact the PMC for more detailed information.

Rangeland Habitat Restoration and Enhancement

***South Texas Natives Project* wins
USDA-NRCS Plant Materials
Outstanding Team Award**



This award is presented in recognition of the best overall performance by a plant materials center, plant materials specialist, and associated program over the past year. South Texas Natives has excelled at providing economically viable sources of

plants and seeds and developing effective planting strategies for the restoration of ecosystems on public and private lands. Under the direction of Paula Maywald, the project fosters a spirit of cooperation and partnership among state and federal agencies, universities, and private landowners and businesses to facilitate the restoration of native habitats in South Texas and assist in the mission of the NRCS Plant Materials Program.



Since 2001, STN has brought in 1,728 collections of grasses, forbs, and shrubs. They have 435 accessions representing 19 species under evaluation at Rio Farms near Monte Alto, with an additional 6 species in seed increase. There are 31 accessions representing 5 species under evaluation and 8 species in seed increase at the Texas Agricultural Experiment Station at Beeville. There are 262 accessions representing 12 species under evaluation at the Texas Agricultural Experiment Station at Uvalde. Another 265 accessions representing 10 species are under evaluation at Rancho Blanco near Larado and one species is under evaluation and 3 species are in seed increase at Bladerunner Farms near Poteet.

2006 Plant Releases

The PMC, STN, and TAES Beeville had 10 cooperative releases in 2006.



**Mariah Germplasm Hooded
Windmillgrass**

The PMC was the lead on the releases of Welder Germplasm shortspike windmillgrass (*Chloris subdolichostachya*), Mariah Germplasm hooded windmillgrass (*Chloris cucullata*), and four bristlegrass releases that will be sold as a blend under the name Catarina Blend bristlegrass: Kika677 Germplasm, Kika819 Germplasm, and Kika820 Germplasm streambed bristlegrass (*Setaria leucopila*), and Kika648 Germplasm plains bristlegrass (*Setaria vulpiseta*).



La Salle Germplasm Arizona Cottontop

STN was the lead on the release of Dilley Germplasm slender grama (*Bouteloua repens*), Chaparral Germplasm hairy grama (*Bouteloua hirsuta*), Atascosa Germplasm Texas grama (*Bouteloua rigidiseta*), and La Salle Germplasm Arizona cottontop (*Digitaria californica*).

The PMC and STN are working on the release of clammyweed (*Polanisia dodecandra*) and orange zexmenia (*Wedelia texana*) for 2007.

The Gulf Coast Ecotype Project:

In 2001, an initiative was begun between the U.S. Fish and Wildlife Service, CKWRI, the Gulf Coast Association of Soil and Water Conservation Districts, the STN Project, and the Kika de la Garza PMC to produce native, ecotypic plant material to displace invasive species on pastures and agricultural fields along the Texas Gulf Coast.

Thirteen species including 4 forbs, 1 cool season grass, and 8 warm season grasses were selected for initial collecting and evaluation. Ten to twenty-five collections of each species are being made by the partners of this project, as well as a few other groups, from the 30 counties along the Texas Gulf Coast.



**Little Bluestem with
Mature Seed**

A nursery has been established at the PMC. Transplants have been planted in irrigated field plots where seed is hand harvested and evaluated for production, germination, and establishment. Successful collections will eventually be released for commercial production.

Since 2001, 110 collections have been received, representing all thirteen species. The field nursery now consists of 82 accessions representing 12 of the 13 species. In 2006, 7 new collections were received. In December 2006, new collections were seeded in the greenhouse. Those exhibiting good germination will be transplanted into the field beginning in the spring.

Activated Carbon and Herbicide Interaction Study:

In June and July of 2006, a greenhouse study was conducted to observe the interactive effects of activated carbon and seven herbicides on the seedling emergence of three species of legumes. Activated carbon has shown signs that it can deactivate some herbicides. In practical application, a landowner could seed his pasture and over

spray the seed row with activated carbon to protect the seeding. He could then follow with a herbicide to control weeds. Spraying at planting time would extend the weed-free period for seedling emergence. This was a cooperative study between the PMC and TAES Beeville. A student worker, Wendy Austin, was responsible for planting the seed and taking data.

Seeds of prairie acacia (*Acacia angustissima*), roundhead prairie clover (*Dalea multiflora*), and BeeWild bundleflower (*Desmanthus bicornutus*) were planted in two rows each in trays of sterilized and sifted Raymondville clay loam. One row of each species was then sprayed with a strip of activated carbon. The entire tray was then sprayed with one of seven herbicides at either full or half strength. A control of no herbicide was also included. Each herbicide treatment was replicated with four trays.



None of the BeeWild seeds emerged, but data was taken on the other two species. The number of seedlings that emerged was recorded weekly for six weeks. Average seedling height was taken at three, five, and six weeks. The number of leaf nodes and total aboveground, dry biomass was also taken at six weeks.

Cadre at both the full and half rates saw considerably more biomass production for both legumes with the use of activated carbon. The half rate, especially on the prairie acacia, showed dramatic differences between the control and the carbon treatment. The 2,4-D treatment at the full rate showed an appreciable increase of biomass production with the use of activated carbon for both legume species.



Roundhead Prairie Clover (left)
Prairie Acacia (right)

It was also the only herbicide that showed dramatic differences in the seedling emergence counts between treatments. Valor and First Rate also showed some effect at the full rate. Overall, there seemed to be an upward trend in biomass production in the activated carbon strips and a downward trend in the unprotected strips.

This greenhouse study will be followed with a field planting that will focus on the promising herbicides Cadre, Valor, 2,4-D, and First Rate with activated carbon.

PhD Student Completes Degree and Project:

After 3 long years, Filiberto Herrera-Cedano graduated with his PhD from TAMUK. Filiberto's dissertation project was evaluating the seed production and seed quality characteristics of two windmillgrass species at the PMC and TAES-Beeville. The 2006 release of Welder Germplasm shortspike windmillgrass and Mariah Germplasm hooded windmillgrass was a direct result of Filiberto's research. Some of the salient points of Filiberto's research:



- The majority of seeds from both windmillgrass species germinated in 3-5 days.
- Viability of filled seed for either species was unaffected by production site.
- Hooded windmillgrass ecotypes had more filled seed and higher active germination rates compared to shortspike windmillgrass ecotypes.
- Shortspike windmillgrass ecotypes had higher dormancy rates (around 33%) than hooded windmillgrass ecotypes (around 14%).
- Seed germination rates of windmillgrass ecotypes were higher at the Beeville production site than at the PMC in Kingsville. (This lends support to the promise that better seed fill can be attained north of Kingsville where night time temperatures occasionally drop into the 60's.)



Hooded Windmillgrass (left)
Shortspike Windmillgrass (right)



In summary, Filiberto observed these characteristics for hooded windmillgrass: high active germination (90%+) typically in the first 3 days, multiple seed crops, prodigious

seed dispersal, and spread by stolons. He observed these characteristics for shortspike windmillgrass: aggressive vegetative spread by stolons and good germination ratios for droughty climate conditions with an average of 60% active germination and 40% dormant seed. The characteristics of the two Texas native windmillgrass species make them ideally suited for planting roadsides, erosion control, range restoration and wildlife habitat improvement under the highly variable weather conditions of South Texas.

Erosion Control/Water Quality Improvement on Agricultural Land

TxDOT Roadside Vegetation Project

A project was established between the PMC, CKWRI, and Texas Department of Transportation (TxDOT) in January 2006 to evaluate some of the methods and species used in roadside revegetation. This study is being conducted and replicated on both clay and sandy soils. The plots were planted in April 2006 in Kingsville, in August in Odessa, and in May in Seymour, Texas. Anna Lund, a graduate student at TAMUK, evaluated the plots at 30, 60, and 90 days.



The success rate of broadcast seeding vs. drill seeding will be compared. Green sprangletop, Bermudagrass, hooded windmillgrass, and shortspike windmillgrass plots were both broadcast and drill seeded in Kingsville. Each plot

was surveyed using the point intercept frame to estimate percent canopy cover.

A soil retention blanket (SRB) treatment will be compared to bare plots to see if the protective mulch provided by the blankets helps create optimal conditions needed for seeds to germinate and grow. This was conducted on clay and sandy soils in Kingsville, Odessa, and Seymour, Texas with hooded windmillgrass, shortspike windmillgrass, and common Bermudagrass. The SRB were applied to half of the 10 by 20 foot plots after the seeds were drilled.



Another section of this study will compare establishment of hooded windmillgrass and shortspike windmillgrass to common bermudagrass in Kingsville, Odessa, and Seymour, Texas. Following seedling emergence, percent canopy cover was estimated using the point intercept method. A mowing treatment typical of TxDOT's will be incorporated into the study in 2007 to document the performance of windmillgrass.

Interspecific competition between native windmillgrass species (including hooded windmillgrass, shortspike windmillgrass, fringed windmillgrass, and slimspike windmillgrass) and Kleberg bluestem (an introduced grass that has been used as forage for livestock and for roadside stabilization) will also be observed. Data will be collected in Kleberg, Jim Wells, and Live Oak counties over a period of two years using the Daubenmire method for estimating canopy cover. Results of this study will help in increasing diversity of grass species along Texas roadside right-of-ways by showing which WMG species are most competitive with Kleberg bluestem. Species that are most resistant to competition by Kleberg bluestem are more desirable for planting along roadways than those susceptible to replacement by exotic grasses.

The 90 day evaluations were completed in December of 2006. Experiments that failed to establish or that provided insufficient data will be reseeded in 2007.